

### **Amendments to the Claims/Listing of Claims:**

This listing of claims will replace all prior versions and listings of claims in the application:

1-11. Canceled

12. (Currently amended) A device for identifying a first analyte of a group of analytes in a biological sample using a substrate having a plurality of repetitively spaced targets thereon, the plurality of targets being configured to bind the first analyte, the device comprising:

an optical source ~~that generates~~ for generating a source beam;

a beam splitter ~~that splits~~ for splitting the source beam into a probe beam and a reference beam;

a signal path along which the probe beam travels;

a reference path along which the reference beam travels, the reference path being at least partially different from the signal path;

a scanner on the signal path ~~that generates~~ for generating relative motion between the probe beam and the substrate ~~such that the probe beam illuminates the plurality of targets on the substrate in a sequential manner to form and producing a time modulated signal beam, the time modulated signal beam being modulated over time by the probe beam illuminating the plurality of repetitively spaced targets on the substrate in a sequential manner as the probe beam and the substrate are moved relative to one another, the time modulated signal beam traveling which travels~~ along the signal path;

an adaptive optical element on both the signal path and the reference path ~~that combines~~ for combining a first portion of the time modulated signal beam and a first portion of the

reference beam to form a first output beam which travels along the signal path and ~~combines for~~  
combining a second portion of the time modulated signal beam and a second portion of the  
reference beam to form a second output beam which travels along the reference path;

a reference path detector on the reference path ~~responsive for responding~~ to the second  
output beam ~~to generate and generating~~ a reference path signal; and

a processing system ~~that determines for determining~~ the presence or absence of the first  
analyte based upon the reference path signal.

13-16. Canceled

17. (Currently amended) The device of claim 12, wherein the scanner spins the substrate  
such that the probe beam is sequentially incident on the plurality of repetitively spaced targets on  
the substrate.

18. (Currently amended) The device of claim 12, wherein the adaptive optical element  
adjusts a static relative longitudinal phase difference between ~~source wavelength is tuned to~~  
~~cause the~~ time modulated signal beam and the reference beam to be substantially in quadrature  
after passing through the adaptive optical element.

19-44. Canceled

45. (Currently amended) The device of claim 12, further comprising:

a motor ~~that spins for spinning~~ the substrate;

wherein the probe beam illuminates the plurality of repetitively spaced targets in a sequential manner; and

the reference detector indicates the presence of the first analyte based on an interference characteristic of the second output beam which has a first interference characteristic if the first analyte is bound to the substrate and a second interference characteristic if the first analyte is not bound to the substrate.

46-58. Canceled

59. (Currently amended) The device of claim 12, further comprising .

a signal path detector on the signal path ~~responsive for responding~~ to the first output beam ~~to generate and generating~~ a signal path signal; and

wherein the processing system determines the presence or absence of the first analyte based upon both the signal path signal and the reference path signal.

60. (Previously presented) The device of claim 59, wherein the processing system computes a difference signal by subtracting one of the signal path signal and the reference path signal from the other of the signal path signal and the reference path signal, and determines the presence or absence of the first analyte based upon the difference signal.

61. (Currently amended) A device for identifying an analyte in a biological sample using a substrate having a plurality of repetitively spaced targets thereon, the plurality of targets being configured to bind the analyte, the device comprising:

an optical source that generates a source beam;

a beam splitter that splits the source beam into a probe beam and a reference beam;

a signal path along which the probe beam travels;

a reference path along which the reference beam travels, the reference path being at least partially different from the signal path;

a scanner on the signal path that generates relative motion between the probe beam and the substrate such that the probe beam illuminates the plurality of repetitively spaced targets on the substrate in a sequential manner to form a time modulated signal beam, the time modulated signal beam being modulated over time due to the relative motion of the probe beam and the substrate and due to the repetitively spaced targets on the substrate, the time modulated signal beam traveling ~~which travels~~ along the signal path;

an adaptive optical element on both the signal path and the reference path that combines a first portion of the time modulated signal beam and a first portion of the reference beam to form a first output beam which travels along the signal path, and combines a second portion of the time modulated signal beam and a second portion of the reference beam to form a second output beam which travels along the reference path;

a signal path detector on the signal path responsive to the first output beam to generate a signal path signal;

a reference path detector on the reference path responsive to the second output beam to generate a reference path signal; and

a processing system that receives the signal path signal and the reference path signal and determines the presence or absence of the analyte based upon the signal path signal and the reference path signal.

62. (Previously presented) The device of claim 61, wherein the processing system computes a difference signal by subtracting one of the signal path signal and the reference path signal from the other of the signal path signal and the reference path signal, and determines the presence or absence of the analyte based upon the difference signal.

63. (Currently amended) The device of claim 61, wherein the ~~source~~-wavelength of the source beam is tuned to cause the signal beam and the reference beam to be in quadrature.

64. (Previously presented) The device of claim 61, further comprising a motor that spins the substrate.

65. (Previously presented) The device of claim 61 wherein the signal detector and the reference detector indicate the presence of the analyte based on interference characteristics of the first and second output beams, the interference characteristics of the first and second output beams being different if the analyte is or is not bound to plurality of targets on the substrate.

66. (Previously presented) The device of claim 61, further comprising an electro-optical modulator on the reference path that imparts a phase shift to the reference beam..

67. (Previously presented) The device of claim 61, further comprising a polarizer on both the signal path and the reference path that polarizes the first output beam before it reaches the signal detector and polarizes the second output beam before it reaches the reference detector.